

Claims

1. A thermoplastic composition, comprising:

about 15 to about 35 weight percent of a poly(arylene ether);

about 15 to about 46 weight percent of a homopolymer of an alkenyl aromatic monomer;

about 10 to about 35 weight percent of a polyolefin;

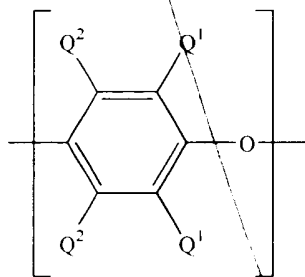
about 1 to about 15 weight percent of a hydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene having an alkenyl aromatic content of about 40 to about 90 weight percent; and

about 1 to about 15 weight percent of an unhydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene;

wherein the composition is substantially free of rubber-modified poly(alkenyl aromatic) resin; and wherein all weight percents are based on the total weight of the composition.

[c2]

2. The thermoplastic composition of Claim 1, wherein the poly(arylene ether) comprises a plurality of structural units of the formula



wherein for each structural unit, each Q^1 is independently halogen, primary or secondary C_1-C_8 alkyl, phenyl, C_1-C_8 haloalkyl, C_1-C_8 aminoalkyl, C_1-C_8 hydrocarboxy, or C_2-C_8 halohydrocarboxy wherein at least two carbon atoms

separate the halogen and oxygen atoms; and each Q^2 is independently hydrogen, halogen, primary or secondary C_1-C_8 alkyl, phenyl, C_1-C_8 haloalkyl, C_1-C_8 aminoalkyl, C_1-C_8 hydrocarboxy, or C_2-C_8 halohydrocarboxy wherein at least two carbon atoms separate the halogen and oxygen atoms.

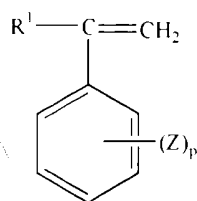
[c4]

4. The thermoplastic composition of Claim 1, wherein the poly(arylene ether) comprises a copolymer of 2,6-bis(hydroxyphenyl)-1,4-bis(hydroxyphenyl) ether

A2

[c5]

5. The composition of Claim 1, wherein the homopolymer of an alkenyl aromatic monomer is a polymerization product of an alkenyl aromatic monomer of the formula



wherein R^1 is hydrogen, $C_1 - C_8$ alkyl, or halogen; Z is vinyl, halogen, or $C_1 - C_8$ alkyl; and p is 0 to 5.

[c6]

6. The composition of Claim 1, wherein the homopolymer of an alkenyl aromatic monomer comprises homopolystyrene.

[c7]

7. The composition of Claim 1, wherein the homopolymer of an alkenyl aromatic monomer comprises atactic homopolystyrene.

[c8]

8. The thermoplastic composition of Claim 1, wherein the polyolefin comprises a homopolymer or copolymer having at least about 80 weight percent of units derived from polymerization of ethylene, propylene, butylene, or a mixture thereof.

[c9]

9. The thermoplastic composition of Claim 1, wherein the polyolefin is a propylene polymer; and wherein the propylene polymer comprises a homopolymer of polypropylene, or a random, graft, or block copolymer of propylene and at least one olefin selected from ethylene and $C_4 - C_{10}$ alpha-olefins, with the proviso that the copolymer comprises at least about 80 weight percent of repeating units derived from propylene.

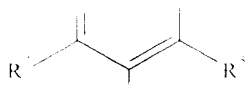
[c10]

10. The thermoplastic composition of Claim 1, wherein the polyolefin comprises a homopolypropylene.

[c11]

11. The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer comprises:

(A) at least one block derived from an alkenyl aromatic compound having the formula



wherein R^2 and R^3 each represent a hydrogen atom, a C_1-C_8 alkyl group, or a C_2-C_8 alkenyl group; R^4 and R^8 each represent a hydrogen atom, a C_1-C_8 alkyl group, a chlorine atom, or a bromine atom; and R^5-R^7 each independently represent a hydrogen atom, a C_1-C_8 alkyl group, or a C_2-C_8 alkenyl group, or R^4 and R^5 are taken together with the central aromatic ring to form a naphthyl group, or R^5 and R^6 are taken together with the central aromatic ring to form a naphthyl group including; and

(B) at least one block derived from a conjugated diene, in which the aliphatic unsaturated group content in the block (B) is reduced by hydrogenation.

[c12] 12.The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer comprises a styrene-(ethylene-butylene)-styrene triblock copolymer.

[c13] 13.The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer has a styrene content of about 50 to about 85 weight percent.

[c14] 14.The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer has a styrene content of about 55 to about 70 weight percent.

[c15] 15.The thermoplastic composition of Claim 1, wherein the unhydrogenated block copolymer comprises a styrene-butadiene diblock copolymer or a styrene-butadiene-styrene triblock copolymer.

[c16] 16.The thermoplastic composition of Claim 1, further comprising a hydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene, wherein the hydrogenated block copolymer has an alkenyl aromatic content of about 10 to less than 40 weight percent.

[c17] 17.The thermoplastic composition of Claim 1, further comprising a polypropylene-polystyrene graft copolymer having a propylene polymer backbone and one or more styrene polymer grafts.

[c18] 18.The thermoplastic composition of Claim 17, wherein the polypropylene-

polymer grafts.

percent of an ethylene/alpha-olefin elastomeric copolymer.

- [c20] 20.The thermoplastic composition of Claim 19, wherein the ethylene/alpha-olefin elastomeric copolymer comprises a copolymer of ethylene and at least one C₃-C₁₀ alpha-olefin.
- [c21] 21.The thermoplastic composition of Claim 19, wherein the ethylene/alpha-olefin elastomeric copolymer comprises an ethylene-butylene rubber, an ethylene-propylene rubber, or a mixture thereof.
- [c22] 22.The composition of Claim 1, wherein the composition is substantially free of reinforcing fillers.
- [c23] 23.The composition of Claim 1, wherein the composition after molding has a flexural modulus measured at 23 ° C according to ASTM D256 of at least about 230,000 pounds per square inch.
- [c24] 24.The composition of Claim 1, wherein the composition after molding has an Izod Notched Impact strength measured at 23 ° C according to ASTM D256 of at least about 1 foot-pound per inch.
- [c25] 25.The composition of Claim 1, wherein the composition after molding has an Izod Notched Impact strength measured at 23 ° C according to ASTM D256 of at least about 2 foot-pounds per inch.
- [c26] 26.The composition of Claim 1, wherein the composition after molding has a heat distortion temperature measured at 66 psi according to ASTM D648 of at least about 240 ° F.
- [c27] 27.The composition of Claim 1, wherein the composition after molding has a flexural modulus at 23 ° C of at least about 230,000 pounds per square inch and an Izod Notched Impact strength measured at 23 ° C according to ASTM D256 of at least about 4 foot-pounds per inch.

Notched Impact strength measured at 23 ° C according to ASTM D256 of at least about 1.5 foot-pounds per inch.

[c29]

29. A thermoplastic composition, comprising:
about 15 to about 35 weight percent of a poly(arylene ether);
about 15 to about 46 weight percent of a homopolystyrene;
about 10 to about 35 weight percent of a polyolefin;
about 1 to about 15 weight percent of a hydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene having an alkenyl aromatic content of about 40 to about 90 weight percent;
about 1 to about 15 weight percent of an unhydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene; and
about 2 to about 20 weight percent of an ethylene/alpha-olefin elastomeric copolymer;
wherein the composition is substantially free of rubber-modified poly(alkenyl aromatic) resin; and wherein all weight percents are based on the total weight of the composition.

[c30]

30. A thermoplastic composition, comprising:
about 15 to about 32 weight percent of a poly(arylene ether) that is the polymerization product of 2,6-dimethylphenol, 2,3,6-trimethylphenol, or a combination thereof;
about 20 to about 46 weight percent of an atactic homopolystyrene;
about 12 to about 30 weight percent of a homopolypropylene; and
about 2 to about 13 weight percent of a styrene-(ethylene-butylene)-styrene triblock copolymer having a styrene content of about 50 weight percent to about 75 weight percent;
about 2 to about 13 weight percent of a styrene-butadiene-styrene triblock copolymer;
wherein the composition is substantially free of rubber-modified poly(alkenyl aromatic) resin; and wherein all weight percents are based on the total weight of the composition.

[c31]

31. A thermoplastic composition, comprising the reaction product of:

monomer 1

about 10 to about 35 weight percent of a polyolefin;

aromatic compound and a conjugated diene having an alkenyl aromatic content of about 40 to about 90 weight percent; and about 1 to about 15 weight percent of an unhydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene; wherein the composition is substantially free of rubber-modified poly(alkenyl aromatic) resin; and wherein all weight percents are based on the total weight of the composition.

- [c32] 32. An article comprising the composition of Claim 31.
- [c33] 33. An automotive component comprising the composition of Claim 31.
- [c34] 34. An automotive underhood component comprising the composition of Claim 31.
- [c35] 35. A food tray comprising the composition of Claim 31.
- [c36] 36. A sheet comprising the composition of Claim 31.